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LEFT VENTRICULAR DIASTOLIC FUNCTIONAL RESERVE DURING EXERCISE IS ABNORMAL IN PATIENTS WITH HYPER-APICAL ROTATION AT REST

ACC Poster Contributions
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Authors: *In Jeong Cho, Chi Young Shim, Jeonggeun Moon, Min-Kyung Kang, Woo-In Yang, Yangsoo Jang, Namsik Chung, Jong-Won Ha, Severance Cardiovascular Hospital, Seoul, South Korea*

Background: Left ventricular (LV) torsion and apical rotation are known to be augmented in patients with early diastolic dysfunction. However, there are limited data regarding how LV apical rotation is related to LV functional reserve during exercise. The purpose of this study was to assess the relationship between resting apical rotation and LV longitudinal functional reserve during exercise.

Methods: We studied 38 subjects (12 males, age 60±10 years) with normal LV ejection fraction and resting E/E' (<15) who underwent graded supine bicycle exercise echocardiography (25W, 3-min increments). Mid short-axis strain, apical short-axis rotation and 4-chamber strain were measured at rest by 2-dimensional speckling tracking method.

Results: The median of apical rotation was 13.5 degree and subjects were divided into two groups according to apical rotation: Group 1 (n=19), apical rotation ≤ 13.5 degree; Group 2 (n=19), apical rotation > 13.5 degree. At rest, radial and longitudinal strain and strain rate, E' and E/E' were similar between the groups. However, E' with exercise (10.3±2.3 cm/s vs. 7.9±1.7 cm/s, p=0.002) and the magnitude of increase in E' with exercise (4.2±1.4 cm/s vs. 2.5±1.2 cm/s, p=0.001) were significantly lower in patients with increased resting apical rotation, suggesting abnormal LV functional reserve in these patients. E/E' (10.6±2.3 vs. 13.7±2.9, p=0.002) and the increment of E/E' during exercise (0.57±1.82 vs. 2.16±2.12, p=0.019) were significantly higher in patients with increased apical rotation. In multivariate analysis, apical rotation was an independent predictor of exercise duration after adjusting for age and gender (p=0.035).

Conclusion: LV diastolic functional reserve during exercise is abnormal in patients with increased LV apical rotation at rest. Hyper-apical rotation at rest might be helpful in identifying a subgroup with lower LV diastolic reserve during exercise and lower exercise capacity.